

**The Internal Revenue Service Can Improve Its
Capacity and Performance Program to
Better Manage the Availability
of Its Computer Systems**

February 2000

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DEPARTMENT OF THE TREASURY
WASHINGTON, D.C. 20220

INSPECTOR GENERAL
for TAX
ADMINISTRATION

February 13, 2001

MEMORANDUM FOR CHIEF INFORMATION OFFICER

FROM:

(for) Pamela J. Gardiner
Deputy Inspector General for Audit

Scott E. Wilson

SUBJECT:

Final Audit Report - The Internal Revenue Service Can Improve
Its Capacity and Performance Program to Better Manage the
Availability of Its Computer Systems

This report presents the results of our review of the Internal Revenue Service's (IRS) capacity and performance management program. In summary, we found that the IRS adequately manages the capacity and performance of its mainframe computer systems, but a more comprehensive program is needed for managing its mid-range systems. Additionally, best practices and other procedures need to be documented to ensure there is consistency in the IRS' capacity planning and performance management program.

We recommended that the Chief Information Officer ensure the program for managing the capacity and performance of mid-range systems is comprehensive, that essential technical information needed for the program is developed, and that currently available information is adequately publicized. Management agreed with our recommendations and developed appropriate corrective actions. Management's response has been incorporated into the report where appropriate, and the full text of the response is included as an appendix.

Copies of this report are also being sent to the IRS managers who are affected by the report recommendations. Please contact me at (202) 622-6510 if you have questions, or your staff may call Scott E. Wilson, Associate Inspector General for Audit (Information Systems Programs), at (202) 622-5896.

**The Internal Revenue Service Can Improve Its Capacity and Performance
Program to Better Manage the Availability of Its Computer Systems**

Table of Contents

Executive Summary.....	Page i
Objective and Scope.....	Page 1
Background	Page 2
Results	Page 4
The Internal Revenue Service Adequately Manages the Capacity and Performance of Its Mainframe Computer Systems	Page 5
A More Comprehensive Effort Is Needed to Effectively Manage the Capacity and Performance of Mid-Range Computer Systems.....	Page 6
Comprehensive Guidelines and Best Practices Would Improve Management of Both Mainframe and Mid-Range Computer Systems.....	Page 10
Conclusion.....	Page 13
Appendix I – Detailed Objective, Scope, and Methodology	Page 14
Appendix II – Major Contributors to This Report.....	Page 18
Appendix III – Report Distribution List.....	Page 19
Appendix IV – Management’s Response to the Draft Report.....	Page 20

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Executive Summary

Management of the capacity and performance of the Internal Revenue Service's (IRS) computer systems is critically important to the IRS' success in providing top quality customer service to taxpayers. To achieve this goal, the IRS is increasingly relying on the ability of its computer systems to provide quick and convenient access to taxpayer information. Therefore, the IRS' capacity and performance management effort must be comprehensive in ensuring that its computer systems have sufficient capacity to process taxpayer information and meet computer systems users' performance needs.

The objective of this review was to assess the efficiency, economy, and effectiveness of the IRS' capacity and performance management program for mainframe and mid-range computer systems. We conducted fieldwork at the IRS National Headquarters; the Martinsburg, Detroit, and Tennessee Computing Centers; the Memphis Customer Service Site; and the former Baltimore District Office.

Results

The IRS has developed a program to adequately manage the capacity and performance of some of its most critical computer systems. However, two areas were identified where the IRS could improve its efforts to better meet the increasing demand being placed on its computer systems.

The Internal Revenue Service Adequately Manages the Capacity and Performance of Its Mainframe Computer Systems

The IRS' program for managing the capacity and performance of its mainframe computer systems includes all of the elements specified for such a program by industry best practices. Collectively, the technical staff of the program has a significant amount of experience with the IRS' complex computer environment. As a result, the IRS is adequately managing the current capacity needs for these computer systems and planning for future capacity needs. The IRS is also actively monitoring the performance of these critical tax processing systems.

A More Comprehensive Effort Is Needed to Effectively Manage the Capacity and Performance of Mid-Range Computer Systems

The IRS does not have a comprehensive program for managing the capacity and performance of its mid-range systems, totaling 628 computers. These systems run many of the IRS' taxpayer programs, including those for electronic filing and identifying

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

taxpayers who are underreporting their taxes. The IRS' program for managing its mid-range systems is primarily focused on analyzing the current utilization rates of a relatively small number of its mid-range systems. Little long-term trending or monitoring occurs, and limited proactive analyses are performed for these computer systems. As a result, the IRS cannot ensure that its mid-range computer systems have adequate capacity. Since the IRS will have spent over \$33.7 million by the end of Calendar Year 2000 and plans to spend at least an additional \$31.8 million over the next 2 years to upgrade and consolidate its mid-range computer systems, increased capacity and performance analysis of the IRS' mid-range computer systems is needed to ensure that adequate information is available for making acquisition decisions, determining whether current capacity is being used effectively, and identifying whether excess capacity exists.

Comprehensive Guidelines and Best Practices Would Improve Management of Both Mainframe and Mid-Range Computer Systems

The IRS does not have comprehensive documentation of the procedures, methods, and techniques needed to manage the capacity and performance of its mainframe and mid-range computer systems. Such documented guidance is needed for two primary reasons: 1) to capture the technical expertise of the IRS' most experienced mainframe Computer Performance Evaluators, a significant number of whom are or will be eligible to retire within the next 5 years, upon which the success of the IRS' capacity and performance program has in part been based, and (2) to communicate essential technical information to both new and inexperienced mainframe and mid-range computer technical staff. Without this technical documentation of the methods and techniques to be used by the technical staff, the IRS will find it difficult to maintain or expand its capacity and performance management program and to assure that in the future its technical staff will possess the expertise needed to assume system performance activities.

Summary of Recommendations

The Chief Information Officer (CIO) needs to ensure the program for managing the capacity and performance of its mid-range systems is comprehensive and includes a strategy for evaluating all of the IRS' consolidated mid-range systems. Additionally, since the IRS may lose a significant portion of its experienced capacity and performance management staff to retirement over the next 5 years, the CIO should ensure that essential technical information currently being used or needed to monitor the capacity and performance of its mainframe and mid-range computer systems is defined, documented, and communicated to the necessary technical staff. In addition, the CIO should ensure that the Capacity Management Branch (CMB) web site and the information available at the site are adequately publicized throughout the organization.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Management's Response: The CIO has developed a strategy to manage the capacity and performance issues for the IRS' mid-range computer systems, which includes installing monitoring software on mid-range computer systems to automate data collection and reduce resources needed to manage these systems. In addition, the CIO has identified several field technical staff who can be assigned to support the CMB. However, if reassigning the field technical staff is not enough, the CMB will hire contractors to increase support in critical areas.

The CMB will develop written guidance on procedures, methods, techniques and other information unique to each CMB report, which will be made available on the CMB web site. The CMB will publicize its web site in a variety of ways, including e-mail, IRS publications, placement on IRS web sites, and an awareness campaign.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Objective and Scope

This report presents the results of our review of the Internal Revenue Service's (IRS) capacity planning and performance management program. This review was directed at assisting the IRS in achieving its goal of providing "top quality service to each taxpayer" by evaluating whether the IRS' capacity and performance program is capable of ensuring that its computer resources are keeping pace with the organization's changing functional and performance demands and will continue to do so in the future.

The overall objective of this review was to evaluate the IRS' capacity planning and performance management program for mainframe and mid-range computer systems.

The overall objective of this review was to assess the efficiency, economy, and effectiveness of the IRS' capacity and performance management program for mainframe and mid-range computer systems. Specifically, we:

- Determined whether end-user performance goals and expectations have been adequately defined, approved, and implemented.
- Assessed the effectiveness of the process for trending future capacity and performance needs.
- Assessed the IRS' ability to analyze the capacity and performance needs of its systems.
- Assessed the effectiveness of the processes for monitoring system capacity and performance.

Audit work was conducted at the IRS National Headquarters; the Martinsburg, Detroit, and Tennessee Computing Centers,¹ the Memphis Customer Service Site²; and the former Baltimore District Office from

¹ Computing Centers support tax processing and information management through a data processing and telecommunications infrastructure.

² Customer Service Sites provide assistance to taxpayers by answering questions, providing assistance, and resolving account-related issues.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

January to August 2000. This review was performed in accordance with *Government Auditing Standards*.

Details of our audit objective, scope, and methodology are presented in Appendix I. Major contributors to this report are listed in Appendix II.

Background

The IRS is increasingly relying on the availability of its computer systems to meet the demands of providing top quality customer service to taxpayers.

To meet the goals of providing top quality customer service, the IRS is increasingly relying on the ability of its computer systems to provide quick and convenient access to taxpayer information. To provide more convenient access, the IRS has been expanding the number of hours per week that its systems are available for accessing information. For example, in August and September 2000, the Martinsburg Computing Center expanded the access time for two of the IRS' key tax processing systems - the Integrated Data Retrieval System (IDRS)³ and the Automated Collection System.

To accommodate the expanding need for longer periods of quick, on-line access to information by IRS business users, the IRS' computer systems will need to have sufficient capacity and to be continually monitored to assure that they will meet the demands for increased on-line access while still completing other essential IRS work in a timely manner. For example, the IRS schedules its processing so that many transactions updating taxpayer accounts are processed in batches at times when on-line access (realtime) is not available, typically during nights and weekends. Consequently, as the hours of on-line availability are expanded, there is less time to process batch transactions, making the IRS' ability to process a greater number of transactions increasingly difficult without sufficient capacity. The IRS is currently in the process of upgrading one of its mission-critical mainframe computer systems to ensure

³ IDRS is an IRS computer system capable of retrieving or updating stored information on a taxpayer's account records.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Industry best practices suggest that capacity and performance management programs include three key processes—trending, proactive analysis, and monitoring.

that the system continues to have the processing capacity needed to process its weekend batch workload in the available time frames. To assure that its computer systems are able to provide quick and convenient access, IRS management must have an effective program for managing capacity and performance.

Our review of industry best practices found that effective capacity and performance management programs include three essential processes. One is *trending*, which involves analyzing historical system capacity and performance data to identify future workload trends. A second is *proactive analysis*, which includes analyzing short-term workload patterns to address performance problems, possibly before they occur and escalate into significant degradations in performance. The third is *monitoring*, which is similar to proactive analysis, but involves continuously examining computer systems to address performance problems as timely as possible.

Performance problems are generally experienced by end-users. The problems are usually related to one of the following: the inability to access computer systems or long delays in retrieving and/or updating information.

For the IRS, capacity and performance management is generally the responsibility of the Capacity Management Branch (CMB), located in the Information Systems, System Support Division. Supporting the CMB's efforts are the computer performance evaluators (CPEs) and systems administrators (SAs) located at IRS facilities, including service and computing centers. The CPEs are responsible for the performance management of the IRS' mainframe computer systems, and SAs are responsible for the overall administration of the IRS' mid-range computer systems.

The size and complexity of the IRS' computer system environment complicates the comprehensive management of the IRS' capacity and performance program.

Complicating the IRS' capacity and performance management effort are the size and complexity of the IRS' computer system environment. As of August 2000, this environment included 41 mainframe computers from 3 manufacturers and 628 minicomputers from 22 manufacturers. As a result, managing the

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

performance and capacity of these computer systems requires a comprehensive program that considers both the number and size of these computer systems and their unique characteristics.

Results

The IRS has developed a program to adequately manage the capacity and performance of some of its most critical computer systems. The IRS' program, to varying extents:

- Identifies processing trends that will require additional capacity investments.
- Analyzes computer system performance to identify potential problems.
- Monitors the performance of its computer systems.

Also, the IRS is making progress in defining and documenting overall end-user performance goals and expectations for the computer systems located at the IRS' computing centers. For example, the Detroit Computing Center had initiated a program to develop service level agreements⁴ for critical and newly developed mainframe and mid-range applications in order to define end-user expectations and monitor the achievement of users' goals.

While the IRS' efforts in managing the capacity and performance of its mainframe computer systems are adequate, there is a need for improvement in managing its mid-range computer systems. For example, the program for mid-range computer systems does not always include consistent monitoring and proactive analysis of these computer systems, due in part to the large number of such computer systems used by the IRS.

⁴ Service level agreements are used to establish a common understanding between the users and the information systems organizations about the level of computer service needed to meet business requirements.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

In addition, there is a need for the IRS to develop comprehensive documentation of the procedures, methods, and techniques needed for managing the capacity and performance efforts for both its mainframe and mid-range computer systems.

The Internal Revenue Service Adequately Manages the Capacity and Performance of Its Mainframe Computer Systems

The IRS' program for managing the capacity and performance of its mainframe computer systems includes all of the activities specified for such a program in industry best practices.

The IRS' program for managing capacity and performance of its mainframe computer systems includes all of the elements of such a program as specified by industry best practices. Collectively, the technical staff of the program has a significant amount of experience with the IRS' complex computer environment. Specifically, the IRS' mainframe program includes the following processes:

- **Trending:** The CMB conducts annual capacity studies for all of the IRS' mainframe computer systems to identify both trends in current and future processing and future capacity needs. In addition, some mainframes are studied more frequently if capacity thresholds are close to being reached.
- **Proactive Analysis:** The CPEs at the computing centers and the CMB analysts at the National Headquarters produce daily, weekly, and monthly charts and analyses for the IRS' mainframe systems to identify unusual processing patterns. These charts, which are posted to the CMB's web site, display information on processor utilization.
- **Monitoring:** The CPEs and CMB analysts actively monitor the performance of the IRS' mainframes using various on-line monitoring tools.

As a result, this program includes managing both the planning for future capacity needs and the adequate monitoring of performance.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

A More Comprehensive Effort Is Needed to Effectively Manage the Capacity and Performance of Mid-Range Computer Systems

The IRS needs a more comprehensive program for managing the capacity and performance of its mid-range computer systems.

The IRS needs a more comprehensive program for managing the capacity and performance of its mid-range computer systems, to make it comparable to its program for mainframe systems. Without an effective program to manage its mid-range systems, the IRS may not have sufficient information to make investment decisions for its mid-range systems. Additionally, without a more comprehensive program, the IRS may not be able to assure its end-users that the computer systems will be available when needed.

Many of the IRS' taxpayer programs are run on mid-range computer systems, including those for electronic filing and identifying taxpayers who are underreporting their taxes. The current state of the IRS' capacity and performance management efforts for these mid-range systems can be summarized as follows:

- **Trending:** The CMB conducts capacity studies for many of the IRS' mid-range computer systems to identify trends in current and future processing and future capacity needs. In Fiscal Year (FY) 2000, seven capacity studies of mid-range computer systems were posted to the CMB's web site. These studies focused primarily on current system utilization rates. Generally, the CMB conducts long-term trending analyses for mid-range computer systems only when requested. For FY 2000, just one of the seven mid-range computer system studies posted by the CMB included a long-term trending analysis.
- **Proactive Analysis:** The CMB analyzes the performance of a relatively small number of the IRS' mid-range computer systems, including several mission critical applications. The CMB also analyzes the performance of systems, usually once a problem has been identified, through its performance monitoring software.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

- **Monitoring:** For many of the mid-range systems at the IRS' computing centers, little monitoring and/or preemptive analysis is performed by the SAs. Instead, these efforts are undertaken on an "ad hoc" basis when performance problems are identified.

The IRS' capacity and performance program does not address all of the IRS' mid-range computer systems.

The IRS' efforts do not address all of the mid-range computer systems due in part to the large number of such computer systems used by the IRS. As of August 2000, the IRS used 628 mid-range computer systems from 22 different manufacturers to support its tax processing applications. According to the CMB, the Branch does not have sufficient resources to analyze all of the IRS' mid-range computer systems or to assess capacity and performance trends for them. Consequently, the CMB focuses on assessing the current utilization of a selected number of computer systems.

Unlike the mainframe program, the IRS' mid-range capacity and performance management program does not have personnel solely committed to performing the tasks and analyses to consistently monitor or proactively analyze the mid-range computer systems. For the mainframe program, CPEs are committed to performing the capacity and performance management tasks. The CPE-type activities for performance management of mid-range systems are performed by the SAs, who are also responsible for the overall administration of these systems. As a result, performance management duties often receive a lesser priority.

Without a comprehensive program, the IRS cannot assure users that its mid-range computer systems will have adequate capacity.

Without a comprehensive program for its mid-range computer systems, the IRS cannot ensure that adequate information will be available to plan for the acquisition of additional capacity, assess whether current capacity is being used effectively, or know whether excess capacity is available. Since the IRS will have spent over \$33.7 million by the end of Calendar Year 2000 and plans to spend at least an additional \$31.8 million over the next 2 years to consolidate and upgrade its mid-range computer systems, the need for this type of capacity and performance analysis will become increasingly important.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

In its 1999 capacity reports, the CMB had already identified 26 mid-range systems that had exceeded acceptable thresholds for processing, memory, and/or storage capacity. However, since not all mid-range systems have been studied, and those studies that had been conducted covered only current utilization, the IRS does not have all of the information available to be able to strategically plan for current and future capacity needs. In addition, since budget requests are input nearly 2 years in advance, the IRS may not have adequate information to ensure sufficient funds to add capacity will be available when needed. Furthermore, without personnel to consistently monitor and proactively analyze the IRS' mid-range computer systems, those computer systems nearing capacity may experience slower response times, or worse, may not be available for use, thus affecting end-users' abilities to do their work in a timely fashion.

The IRS' consolidation of its mid-range computer systems provides an example of how capacity planning information is needed. The IRS is currently in the process of consolidating its mid-range computer systems in its computing and customer service centers. In planning this effort, information on the current and future capacity needs of the computer systems to be consolidated would have been useful in estimating the total cost of the project. In addition, though some capacity information is now being used to amend the schedule of computer systems to be consolidated, such information would have been useful in developing the migration schedule. The information would have allowed the IRS to prioritize the schedule during planning, based in part on when computer systems would be at or nearing acceptable capacity thresholds.

The IRS' mid-range consolidation project will offer the IRS an opportunity to improve its capacity and performance program for its mid-range systems.

The IRS' mid-range consolidation project will provide the IRS with an opportunity to improve the program for managing the capacity and performance of its mid-range computer systems. The consolidation, while occurring over the next several years, should have the following effects:

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

- Significantly reduce the number of mid-range computer systems, currently at 628.
- Centralize the location of the mid-range systems to primarily three computing centers, with some also located at the IRS' customer service centers.
- Reduce the amount of SA support needed.

Thus, the IRS should consider organizationally reallocating and realigning the available SAs to carry out the capacity and performance management tasks for the newly consolidated systems. With fewer mid-range computer systems to manage and a number of SAs specifically tasked with system capacity and performance activities, the CMB should have sufficient resources to study the current and future capacity trends for all consolidated mid-range computer systems.

Recommendations

1. The Chief Information Officer (CIO) should develop a strategy to comprehensively manage both the short- and long-term capacity issues of all of the IRS' mid-range computer systems. This should include an assessment of the best approach for ensuring that personnel are committed to capacity and performance management activities.

Management's Response: The CIO has developed a strategy to manage the capacity and performance issues of the IRS' mid-range computer systems. This strategy includes analyzing the capacity of all systems scheduled for consolidation. In addition, monitoring software will be installed on mid-range computer systems to automate data collection and reduce the resources needed to manage these systems.

2. The CIO should consider organizationally reallocating and realigning an appropriate number of available SAs, who would likely be freed from their responsibilities, as a result of mid-range (Tier II) consolidation, to manage the performance of the consolidated mid-range computer systems.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Management's Response: The CIO has identified several CPEs and SAs who can be assigned to support capacity management or other appropriate organizations. In addition, the CMB will need to fill key technical positions to replace the loss of experienced staff. However, if reassigning the field technical staff is not sufficient, the CMB will hire contractors to increase support in critical areas.

Comprehensive Guidelines and Best Practices Would Improve Management of Both Mainframe and Mid-Range Computer Systems

The IRS does not have comprehensive documentation of the procedures, methods, and techniques needed to manage the capacity and performance of its mainframe and mid-range computer systems. Such documented guidance is needed for two primary reasons:

- To capture the technical expertise of the IRS' most experienced mainframe CPE analysts, a significant number of whom are or will be eligible to retire within the next 5 years. The success of the IRS' capacity and performance effort is based in part upon the many years of experience the CMB staff has with IRS systems.
- To communicate essential technical information to both new and inexperienced mainframe and mid-range computer technical staff.

Without the technical documentation of the methods and techniques to be used by the CPEs and SAs, the IRS will find it difficult to expand the capacity and performance management program of its mid-range computer systems and to maintain the current level of its program by assuring that its future technical staff will possess the expertise needed to assume system performance activities.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Comprehensive guidance is needed to ensure that the IRS' mainframe and mid-range computer systems are consistently managed.

The overall duties and responsibilities of the CPEs and SAs are defined in the Internal Revenue Manual (IRM). However, the IRM does not specify the detailed procedures, methods, and techniques needed to execute these responsibilities. The CMB is tasked, through its mission statement, with providing functional and technical guidance to business, Information Systems, and field organizations, which include the field CPEs and SAs. The guidance for managing capacity and performance for both the mainframe and mid-range computer systems should be comprehensive, to ensure that the best practices for managing these systems are consistently used by all CPEs and SAs.

In the absence of specific guidance, many of the CPEs and SAs either develop their own informal procedures or use vendor documentation. In some cases, these procedures do not provide all of the information needed by the CPEs and SAs. For example, one group of SAs wanted to more proactively tune their computer systems; however, they did not have any guidance on how to do this.

The CMB's primary source of guidance to the CPEs and SAs is the capacity reports prepared by the CMB. These reports contain the methodology used to analyze a system's capacity and performance as well as the results, conclusions, and recommendations based on the analysis. The reports are posted to the CMB's web site, which also includes performance graphs for most of the IRS' mainframe computer systems and two mid-range systems as well as administrative information on the CMB and suggested third-party training providers. The CMB plans to continue improving the site by adding additional reports and graphical information.

Although the CMB has made progress in placing information on its web site, the site does not have the detailed information needed by the CPEs and SAs. Our discussions with CPEs and SAs identified that some did not know about the web site and others did not find the information useful. The CMB has recognized the need to aggressively market its web site by taking the

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

The CMB has collectively lost 102 years of experience due to retirements since June 2000, with the potential to lose an additional 221 years of service and experience due to retirements over the next 5 years.

opportunity to present an overview of its products and services during visits to IRS field sites but has not yet undertaken an extensive effort to make its web site known within the IRS.

In developing comprehensive procedures, techniques, and methods, the IRS would also have the opportunity to capture a significant amount of experience that may be lost due to the retirement of CMB analysts. Over the next 5 years, the CMB is facing a potential turnover due to retirements of a third of its staff, with approximately 20 percent of the staff currently eligible. The CMB has collectively lost 102 years of experience due to retirements since June 2000, with the potential to lose an additional 221 years of service and experience due to retirements over the next 5 years. Since the CMB's staff not only conducts capacity analyses but also assists in diagnosing and resolving emerging system problems, this loss could limit the CMB's ability to manage the capacity and performance of the IRS' computer systems. Both CMB and CPE personnel have indicated that it takes several years of experience with the IRS' computer systems for CPE analysts to become fully proficient in dealing with capacity and performance issues within the IRS' complex computer environment.

Recommendations

3. The CIO should ensure that essential technical information currently being used or needed to monitor the capacity and performance of the IRS' mainframe and mid-range computer systems is defined, documented, and communicated to the necessary technical staff. The documentation should include, but not be limited to, recommended operating procedures, methods, and techniques. Management should solicit input from the field CPEs and SAs when developing the guidance they need.

Management's Response: The CMB will develop written guidance that describes procedures, methodologies, data gathering techniques, frequency of

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

reports, and other information unique to each CMB report. This guidance will be made available on the CMB web site.

4. The CIO should more proactively publicize the CMB web site and the information available at the site throughout the organization.

Management's Response: The CMB will publicize its web site in several ways, including e-mail, announcements in IRS publications, and an awareness campaign. In addition, other organizations will be asked to help publicize the CMB web site. The CMB will also register the web site on the IRS' Intranet search engine.

Conclusion

While the IRS has developed a program to adequately manage the capacity and performance of its most critical computer systems, there are two areas where improvements can be made. The IRS needs to comprehensively manage the capacity and performance of its mid-range systems as well as define, document, and communicate essential technical information for managing the capacity and performance of its mainframe and mid-range computer systems. Such improvements will enable the IRS to better meet the increasing demand being placed on its computer systems as well as protect its current and future investment in its computer systems.

Detailed Objective, Scope, and Methodology

The overall objective of this review was to assess the efficiency, economy, and effectiveness of the Internal Revenue Service's (IRS) capacity and performance management program. This review assessed the IRS' capacity and performance management program for mainframe (Tier I) and mid-range (Tier II) systems only. Specifically, we:

- I. Determined whether end-user system performance goals and expectations had been defined, approved, and implemented for all Tier I and II systems and assessed their adequacy.
 - A. Identified requirements for defining and documenting end-user system performance goals and expectations for Tier I and II systems.
 1. Researched the Internal Revenue Manual to identify criteria that would serve as the basis for determining service level agreements or any other agreements between the Capacity Management Branch (CMB) and its customers.
 2. Identified other available sources of information to obtain criteria defining end-user goals and expectations requirements.
 - B. Determined whether end-user system performance goals and expectations had been defined and documented (possibly through performance measures and/or service level agreements) for all Tier I and II systems.
 1. Interviewed CMB personnel and determined:
 - a. Whether end-user goals and expectations for Tier I and II systems had been identified and documented and obtained pertinent documentation.
 - b. How system performance measures were developed and how often they were updated/evaluated.
 2. Determined whether end-users had documented their specific system performance goals and expectations.
 3. Determined whether IRS field functions were involved in the development of end-user system performance goals and expectations and whether end-user system performance requirements met their needs.
 - C. Determined whether a process was in place to assess whether performance goals and expectations were reasonable and met.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

- D. Determined whether end-users' management approved end-user system performance goals and expectations.
- E. Determined whether end-user system performance requirements were achieved for end-users at selected field sites.
 - 1. Interviewed field personnel to determine whether end-user needs were being met in relation to capacity, response time, resource planning, and system availability. Determined whether any local logs were maintained to identify system problems and reviewed those logs to identify any serious problems in system response and accountability.
 - 2. Reviewed and analyzed help desk tickets (from the Integrated Network and Operations Management System) to determine whether there were any significant or recurring problems with system availability and whether system response time and performance issues were resolved promptly.
- II. Determined whether the IRS had an effective program for managing the system capacity and performance needs of its Tier I and II systems.
 - A. Determined whether the scope of the CMB's capacity and performance planning efforts were sufficiently broad to assure that the Tier I and II systems perform adequately.
 - 1. Conducted interviews with CMB managers and personnel to identify the scope of their responsibilities, their work products, and the issues they address.
 - 2. Identified and obtained access to all Fiscal Year (FY) 1999 CMB studies.
 - 3. Reviewed historic files to identify issues addressed by the CMB and other work products for which it is responsible.
 - B. Determined whether appropriate industry and vendor standards and performance indicators were being used to assess performance and capacity.
 - 1. Identified performance indicators used by the IRS to monitor systems performance and evaluated those as compared to industry standards and vendor representations with respect to capacity and performance norms.
 - 2. Interviewed computer performance evaluator (CPE) personnel in both the field and IRS National Headquarters to determine whether industry and vendor standards were being used to monitor system performance and to what extent they were being used.
 - 3. Evaluated the effectiveness of the system performance indicators used to monitor system performance.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

- C. Identified industry best practices that may not have been implemented at the IRS and determined whether they should be considered by the IRS.
 - D. Evaluated the effectiveness of communications between the CMB and other Information Systems organizations regarding capacity issues such as future trends and workload changes.
 - 1. Determined whether effective communications occurred between the CMB and the customers of its work products and field CPEs.
 - 2. Identified whether there was an effective process for following up on recommendations and assessments made by the CMB.
 - 3. Determined whether the CMB web site was an effective tool for communicating procedures for managing capacity and industry standards to field CPEs.
- III. Determined whether the IRS had an effective process for monitoring and addressing system capacity and performance problems on an as-needed basis for Tier I and II systems.
- A. Identified what tools were used to monitor system performance on an on-line basis and determined whether they were used regularly in diagnosing system capacity.
 - B. Determined whether sufficient proactive, on-line monitoring of capacity and performance was occurring to detect developing bottlenecks and unexpected degradations in system performance.
 - C. Determined whether there was an effective ongoing effort to tune systems to achieve optimal system performance and desired system performance levels.
 - D. Determined whether effective escalation procedures for performance problems existed, were followed, and were appropriate in resolving problems.
- IV. Determined whether the IRS had an effective process for forecasting the future capacity and performance needs of its Tier I and II systems and predicting needed upgrades.
- A. Determined whether the IRS had effective procedures and guidelines for performing and preparing periodic system capacity and performance studies.
 - B. Evaluated the capacity studies performed for FY 1999. For each study, determined whether a process existed to assure that:
 - 1. Appropriate historic data were used and the historic data in the study adequately reflected the way in which the IRS used its systems.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

2. The methodology used in the study adequately considered equipment utilization potential, trends in IRS processing, changes in IRS business practices, and potential system bottlenecks.
 3. Assumptions about future growth adequately reflected the actual growth in system use and the future effects of technological change.
 4. The limitations of the current systems were appropriately considered in predicting the future performance of the system.
 5. Studies were completed timely.
- C. Determined whether the capacity and performance studies were adequately considered in the IRS' decision process for upgrading and replacing systems equipment.
- D. Determined whether the CMB's studies covered the applications that will be involved in Tier II consolidation.

**The Internal Revenue Service Can Improve Its Capacity and Performance
Program to Better Manage the Availability of Its Computer Systems**

Appendix II

Major Contributors to This Report

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**The Internal Revenue Service Can Improve Its Capacity and Performance
Program to Better Manage the Availability of Its Computer Systems**

Appendix III

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**The Internal Revenue Service Can Improve Its Capacity and Performance
Program to Better Manage the Availability of Its Computer Systems**

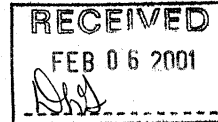
Appendix IV

Management's Response to the Draft Report



DEPARTMENT OF THE TREASURY
INTERNAL REVENUE SERVICE
WASHINGTON, D.C. 20224

FEB - 5 2001



MEMORANDUM FOR TREASURY INSPECTOR GENERAL FOR TAX
ADMINISTRATION

FROM: *for* Toni L. Zimmerman *Peru Shaw*
Acting Chief Information Officer

SUBJECT: Management Response to Draft Audit Report – "The
Internal Revenue Service Can Improve Its Capacity and
Performance Program to Better Manage the Availability
of Its Computer Systems" (Audit No. 200020001)

Thank you for the opportunity to comment on your draft report, dated January 2, 2001, on our efforts to improve our Capacity and Performance Program to better manage the performance of our computer systems.

We appreciate you recognizing our efforts to manage the capacity and performance of our mainframe computer systems. We agree with your assessment that we can develop a more comprehensive program to manage the capacity and performance of our mid-range computer systems. Information Systems is leading this effort, together with all stakeholder organizations.

We developed a strategy to better manage the capacity issues of mid-range computer systems. This strategy includes installing capacity and performance management software to automate performance data collection and reduce the resources needed to manage mid-range systems. We will reallocate appropriate personnel to manage system performance, when they are freed from their responsibilities as a result of mid-range consolidation. To ensure consistency in our capacity planning and performance management program, we will document and publicize procedures on our Capacity Management Branch web site.

Attached are our corrective actions, which address your recommendations, in the management response. If you have any questions, please call me at (202) 622-6800. Members of your staff may call Diane R. Robinson, Acting Chief Program Oversight and Coordination Office, at (202) 283-4128.

Attachment

cc: Associate Inspector General for Audit (Information Systems Programs)
Director, Legislative Affairs

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Attachment

Management Response to Draft Audit Report – “The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems” (Audit No. 200020001)

Recommendation #1

The Chief Information Officer (CIO) should develop a strategy to comprehensively manage both the short- and long-term capacity issues of all of IRS' mid-range computer systems. This should include an assessment of the best approach for ensuring that personnel are committed to capacity and performance management activities.

Assessment of Cause

Having a large number of Tier II mid-range computer systems (over 600) and a limited number of qualified technical personnel (caused by retirements, anticipated retirements, and attrition) hinders the ability to conduct capacity management and performance analyses of mid-range systems.

Corrective Actions for Recommendation #1

Information Systems developed the following strategy to manage the capacity issues of these mid-range systems:

By consolidating Tier II systems, the number of platforms will be much smaller than in the past. It is estimated that the number will decrease from the over 600 systems to approximately 30 in 2004. The Capacity Management Branch (CMB) is focusing on the consolidated systems that will eventually house the majority of Tier II applications and data. During the phased-in consolidation, the CMB will do a capacity analysis on all systems scheduled for consolidation. The consolidated systems include all the SUN E10000 systems at the computing centers and all the Sequent NUMA-Q systems at the service centers. The CMB is installing capacity and performance monitoring software (Athene) on all Sun and Sequent systems to automate performance data collection and reduce the resources needed to manage Tier II systems. Consolidating Tier II systems will free up some field systems support personnel for use elsewhere. The CMB will assign some of them to capacity management. (See Recommendation #2.) In addition, if needed, contractors can be hired to increase support in critical areas.

Implementation Dates Corrective Actions #1a and #1b

Corrective Action #1a

Completed: January 24, 2001
Developed strategy to address mid-range computer system capacity issues.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Attachment

Management Response to Draft Audit Report – “The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems” (Audit No. 200020001)

Corrective Action #1b

Proposed: June 1, 2001
Install Athene capacity and performance monitoring software on all current SUN E10000 and Sequent systems.

Responsible Official(s) for Corrective Action #1a and #1b

Chief Information Officer IS
Deputy Chief Information Officer IS
Director, Enterprise Operations IS:E
Director, Systems Support Division IS:SS

Corrective Action #1b Monitoring Plan

After the installation of Athene performance monitoring software on Sequent and SUN E10000 systems, the CMB will assess system performance and report annually to the Deputy Chief Information Officer for Operations, and solve performance issues.

Recommendation #2

The CIO should consider organizationally reallocating and realigning an appropriate number of available Systems Administrators, who would likely be freed from their responsibilities, as a result of mid-range (Tier II) consolidation, to manage the performance of the consolidated mid-range computer systems.

Assessment of Cause

Having a large number of Tier II mid-range computer systems (over 600) and a limited number of qualified technical personnel (caused by retirements, anticipated retirements, and attrition) hinders the ability to conduct capacity management and performance analyses of mid-range systems. Similarly, the mainframe analysis staff needs additional capacity and performance experience because of the loss of experienced personnel and increased workload from modernization.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Attachment

Management Response to Draft Audit Report – “The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems” (Audit No. 200020001)

Corrective Action #2

The Corporate Computing Phase III Organization Initiative identified several mainframe Computer Performance Evaluators (CPEs) and Tier II System Administrators (SAs) in the field who can be assigned to support Tier-I and Tier-II capacity management or other appropriate organizations. These field Systems Administrators will ease the shortfall of qualified technical analysts in the capacity management organization. In addition, the Capacity Management Branch (CMB) will fill key technical positions to replace the loss of experienced personnel. If reassigning the field technical staff is not enough, the CMB will hire contractors to increase support in critical areas.

Implementation Date Corrective Action #2

Proposed: October 1, 2001
Complete reassignment of CPEs and SAs to manage the performance of consolidated computer systems.

Responsible Official(s) for Corrective Action #2

Chief Information Officer IS
Deputy Chief Information Officer IS
Director, Enterprise Operations IS:E
Director, Systems Support Division IS:SS

Corrective Action #2 Monitoring Plan

After October 1, 2001, the CMB will monitor reassignments, and advise the Director of Systems Support Division when they have reached a level of experienced personnel.

Recommendation #3

The CIO should ensure that essential technical information currently being used or needed to monitor the capacity and performance of the IRS' mainframe and mid-range computer systems is defined, documented, and communicated to the necessary technical staff. The documentation should include, but not be limited to, recommended operating procedures, methods, and techniques. Management should solicit input from the field CPEs and SAs when developing the guidance they need.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Attachment

Management Response to Draft Audit Report – “The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems” (Audit No. 200020001)

Assessment of Cause

We have numerous computer system environments in the three computing centers and the service centers. Based on the workload, the Capacity Management Branch (CMB) developed different methodologies for each environment to more accurately show the performance results of different workloads. The details of each of these methodologies are explained within each capacity analysis report, but no common place exists to access them. Written guidance (an online “handbook”) describing them and a way to access them (the web site) would be beneficial.

Corrective Action #3

The Capacity Management Branch (CMB) will develop written guidance that describes the operating procedures, methodologies, data gathering techniques, frequency of reports, and other data unique to each report. The CMB will make this guidance available on their web site. (See Recommendation #4.)

Implementation Date Corrective Action #3

Proposed: August 1, 2001
Develop and post the Capacity Management guidance on their web site.

Responsible Official(s) for Corrective Action #3

Chief Information Officer IS
Deputy Chief Information Officer IS
Director, Enterprise Operations IS:E
Director, Systems Support Division IS:SS

Corrective Action #3 Monitoring Plan

Based on monthly reviews of feedback from the Information Systems field and other organizations, the CMB will update the written guidance, when needed.

The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems

Attachment

Management Response to Draft Audit Report – “The Internal Revenue Service Can Improve Its Capacity and Performance Program to Better Manage the Availability of Its Computer Systems” (Audit No. 200020001)

Recommendation #4

The CIO should more proactively publicize its web site and the information available at the site throughout the organization.

Assessment of Cause

Although a CMB web site already exists, many IRS employees who could use the information there are unaware of it. CMB needs to do more to bring the web site, its capacity and performance information, the capacity management guidance (See Recommendation #3), to people needing the information.

Corrective Action #4

The Capacity Management Branch (CMB) will publicize its web site in several ways, including the use of Outlook mail, announcements in IRS internal publications, an awareness campaign in status reporting, and registration of the web site. In addition, other organizations will be asked to help publicize the web site. Better promotion will help people access the capacity management and performance monitoring information on the web site. The CMB will register the web site so people can find it using the IRWeb Intranet Search Engine.

Implementation Date Corrective Action #4

Proposed: August 1, 2001
Proactively publicize the Capacity Management Branch web site.

Responsible Official(s) for Corrective Action #4

Chief Information Officer IS
Deputy Chief Information Officer IS
Director, Enterprise Operations IS:E
Director, Systems Support Division IS:SS

Corrective Action #4 Monitoring Plan

Monthly, the CMB will review and improve the effectiveness of the promotion effort.